

## Photonics Spectra Laser Column

Those of you that read Photonics Spectra may have noticed the addition of a laser safety item. This is the outcome of efforts by the LBNL Laser Safety Program to get more visibility for laser safety. A number of individuals involved with laser safety will be contributing articles during 2012.

## Laser Laboratory Design Guide

The LBNL Laser Safety Program is close to releasing a Laser Lab Design Guide. What many may find to be the most useful portions of the guide will be the checklist of items to consider- from required permits and institutional requirements to commonly overlooked problems, such as sensitive equipment positioned right under air ducts and poor positioning of shelves over optical table - and images of good and poor layout examples. The guide will be announced and available by the end of May.



- Laser Safety Doggles
- Photonics-Spectra Laser Column
- Laser Laboratory Design Guide
- LBNL Optics Shop
- Laser Radiation Detector
- Off the Beaten Path: Laser Mine Detector
- Science Humor

Can you guess the lab this cover photo is from? There's a prize if you can.

## Laser Safety Doggles

Laser Safety Doggles® provide pets with eye protection during veterinary laser therapy. Cold Laser therapy for pets is a growing procedure that is providing pets relief from arthritis and chronic pain while encouraging healing. As cold laser technology grows, with it new safety precautions will be required. Currently, laser operators are required to wear

laser safety eyewear and patient protective eyewear is on the rise. Our videos show you how to place the Doggles® onto three different dogs with the three different sizes of Doggles®. Each of our models is a different breed, or different mix of breeds, with unique 'dogalities' and temperaments.  
<http://www.laserdoggles.com/>



## LBNL Optics Shop

As a reminder LBNL has some special shops that are available to users. The Optics Shop is one of those services. The optics shop offers precision component fabrication to meet user specifications. This can be performed on optics purchased from commercial firms. The optics shop offers the following services:

- Polishing large parts
- Crystal substrate surface polishing
- Precision sawing of ultra hard or brittle materials using diamond tooling
- Knife-edge / Slit fabrication and lapping
- Exotic materials- MgO, Ge, Si, SrTiO<sub>3</sub>, Piezo crystals, etc
- Polish metal alloys to micro-inch finish
- Bore holes 1mm and larger through glassy materials
- Optical test surfaces for flatness to 1/10 wave visible light



Contact Rod Post [RLPost@lbl.gov](mailto:RLPost@lbl.gov) or Daniel Lee [dlee@lbl.gov](mailto:dlee@lbl.gov) for a more detailed review of services and charges. In addition Daniel can tell you about Vacuum Brazes, Vacuum Deposition of Films, Furnace heat treatment & bake out, services offered.

## Laser Radiation Detector

**The system described below has been suggested as an item in laser labs to detect stray beams, what do you think?** The HARLID (High Angular Resolution Laser Irradiance Detector) module is designed for use in Laser Warning Receivers to detect and provide angle-of-arrival information for incident laser pulses from range finders and target designators and active laser E.O. systems. The TO-8 detector module makes use of 9-element silicon and InGaAs detector arrays assembled in a sandwich configuration, in conjunction with a digital Gray code mask which provides an encoding of the signal for angle determination. The silicon and InGaAs detector array assemblies have a combined spectral sensitivity range between 500 and 1650 nm. Two side-by-side array assemblies provide high and low sensitivity channels, the first having high quantum efficiency over the full wavelength range, while signal in the second array is attenuated by 15 dB, to extend the dynamic range for detection of high power laser pulses. The module field-of-view is  $\pm 45^\circ$  in both azimuth and elevation, and the angular resolution from a 6-bit digital word is as low as  $\pm 0.8^\circ$  in one plane—either azimuth or elevation—depending on the module orientation. Three reference channels are provided in each array for signal level determination.

## Off the Beaten Path: Laser Mine Detector

Posted by John Keller

**PANAMA CITY, Fla., 8 April 2012.** U.S. Navy undersea warfare experts are working together with designers at the Northrop Grumman Corp. Aerospace Systems segment in Melbourne, Fla., to move an important laser-based mine-detection system to its final developmental phase before full-scale production. The Navy awarded Northrop Grumman Aerospace a \$27.1 million contract modification Thursday to begin low-rate initial production (LRIP) of the Northrop Grumman AN/AES-1 Airborne Laser Mine Detection System (ALMDS). Awarding the contract were officials of the Naval Surface Warfare Center Panama City Division in Panama City, Fla.



The AN/AES-1 ALMDS electro-optical system, which will be among the first airborne organic mine countermeasure (OMCM) systems fielded, is designed to detect, classify, and pinpoint floating and near-surface moored mines using a light detection and ranging (LIDAR) imaging sensor attached to the side of a Navy MH-60S helicopter. The system, which will be part of the mine countermeasures (MCM) mission package on the new Littoral Combat Ship (LCS), is designed for rapid wide-area reconnaissance and assessment of anti-ship mines in coastal waters, harbors, confined straits, choke points and amphibious assault areas where aircraft carriers and expeditionary strike groups must operate.

## Science Humor

- 1) Q: What do you get if you divide the circumference of a jack-o-lantern by its diameter?  
A: Pumpkin Pi!
- 2) Q: Why do you rarely find mathematicians spending time at the beach?  
A: Because they have sine and cosine to get a tan and don't need the sun!
- 3) Q: What does a mathematician present to his fiancée when he wants to propose?  
A: A polynomial ring!
- 4) This sign was hung up in a physics lab: "Hangin' With My Ohmies"
- 5) The Flood is over and the ark has landed. Noah lets all the animals out and says, "Go forth and multiply."  
A few months later, Noah decides to take a stroll and see how the animals are doing. Everywhere he looks he finds baby animals. Everyone is doing fine except for one pair of little snakes.  
"What's the problem?" says Noah.  
"Cut down some trees and let us live there", say the snakes.  
Noah follows their advice. Several more weeks pass. Noah checks on the snakes again. Lots of little snakes, everybody is happy.  
Noah asks, "Want to tell me how the trees helped?"  
"Certainly", say the snakes. "We're adders, so we need logs to multiply."
- 6) How many software engineers does it take to change a light bulb? None. They wouldn't do it. It's a hardware problem.
- 7) Q: What is polite and works for the phone company?  
A: A differential operator...
- 8) Every dipole has its moment.
- 9) Free radicals have revolutionized chemistry.
- 10) Got mole problems? Call Avogadro at 602-1023.
- 11) Have you heard the one about a chemist who was reading a book about helium and just couldn't put it down?
- 12) If a bear in Yosemite and one in Alaska both fall into the water, which one dissolves faster? The one in Alaska, because it is polar.
- 13) How many physical chemists does it take to change a light bulb? Only one, but he'll change it three times, plot a straight line through the data, and then extrapolate to zero concentration.
- 14) How many physical chemists does it take to wash a beaker? None. That's what organic chemists are for!
- 15) Physicists get a big bang.
- 16) Physics majors do it at the speed of light.
- 17) Plasma physicists do it with everything stripped off.
- 18) Spectroscopists do it until it hertz.
- 19) Spectroscopists do it with frequency and intensity.
- 20) Lab assistants do it on the bench.
- 21) If you do research in optics you will have to do some light reading.
- 22) Those who study tornadoes have twistered minds.
- 23) Scientists studying the sun have a flare for research
- 24) Einstein developed a theory about space, and it was about time too.